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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,963	02/17/2004	Frank Holler	3081.55US01	9112
24113	7590	09/16/2005	EXAMINER	
PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A. 4800 IDS CENTER 80 SOUTH 8TH STREET MINNEAPOLIS, MN 55402-2100			CHANG, AUDREY Y	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/779,963

Applicant(s)

HOLLER, FRANK

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 July 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-30 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on July 14, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 9, and 11 and has newly added claims 21-30.
- Claims 1-30 remain pending in this application.

### *Response to Amendment*

1. The amendment filed **July 14, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claims 1 and 11 have been amended** to include the phrase "the superimposing unit comprising a first beam splitter and a second beam splitter and *lacking a retroreflector* that receives light that is remitted through the first or second beam splitter and reflects it back to the first or second beam splitter". The specification simply **fails** to provide the support of the feature concerning "lacking a retroreflector".

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2872

3. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on newly added matters are set forth in the paragraph above.

4. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was **not** described in the specification in such a way as to **enable** one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

**Claims 1 and 11 have been amended** to include the phrase “lacking a retroreflector that receives light that is remitted through the first or second beam splitter and reflects it back to the first or second beam splitter”. This is not possible by the disclosure since the image light transmitted by the first beam splitter will be *retro-reflected* by the object back to the first beam splitter.

5. **Claims 21-30 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was **not** described in the specification in such a way as to **enable** one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could the feature “an image perceivable by a viewer as being superimposed in a field of a view including an object located in an object plane” can be achieved by the description of claim 21. Nothing concerning the “superposing” is being explicitly described and no logical relationships among the elements recited in claim 21 to enable the above mentioned and claimed feature.

*Claim Objections*

**6. Claims 1-20 and newly added claims 21-30 are objected to because of the following informalities:**

(1). Claims 1-20 and 21-30 are *incomplete* for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the *superimposing unit* and the *image generating device*. It is not clear **what** is being **superimposed** here by the “superimposing unit“. The generated image seems to be “superimposed“ on the object by the focusing lens not by the “superimposing unit, (please see Figures 1-2 and the specification). It is therefore not clear what is being superimposed here by the “superimposing unit” and it is not clear the essential structural and logical relationships between the superimposing unit with the image generating device to make the scopes of the claims clear. **The amendment to claims 1 and 11** claims the superimposing unit with a first and second beam splitter and lacking a retroreflector but **it fails to** overcome the objection since it is still not clear what is being “superimposed” here. Furthermore, the *negative* limitation of the “lacking retroreflector” is completely confusing since it does not provide any positive structural relationships among the elements that are in the claims.

*The amended claims 1-20 and newly added claims 21-30 are incomplete* since it fails to provide the logical and structural relationship between the first and second beam splitters and the image generating means to define an operable device and operable method.

**Appropriate correction is required.**

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-9 and 11-20 and newly added claims 21-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ferguson (PN. 6,379,009) in view of the patent issued to Piosenka et al (PN. 5,359,444).**

***Claims 1 and 11 have been amended and the newly added claims 21-30 add new claim combination that necessitate the new grounds of rejection.***

Ferguson teaches a conjugate optics *projection display* that is comprised of an *image projector* (16, Figures 1 and 2) for generating an image in an image plane and a *first and second beam splitters* (14 and 12, **with regard to amended claims 1 and 11 and newly added claim 21**) serves as the *superimposing unit* such that the *projected image* via conjugate optics will be *superimposed* on a real, actual *object* (11) at an *object plane* and the superimposed image will be viewed by an observer (10), wherein the image projector and the superimposing unit are *mounted* on a *head wearable support unit*, (please see Figures 1-2, the abstract and columns 3-4).

**With regard to amended claims 1 and 11** which includes the feature of “lacking retroreflector for receiving beams light that is transmitted by the first or second beams splitter and reflects to the first or second beam splitter”, it is implicitly true that the image light transmits through the beam splitter (14) can be reflected by the second beam splitter (12) to the object and back to the observer *without* going through the retro reflector. The feature concerning the “lacking a retroreflector” is further rejected under 35 USC 112, first paragraph, for being a newly introduced matters and for failing to enable the device and method.

Ferguson teaches that the projected image is intended to be superimposed with the actual and real object in order to enhance the viewing of the actual object, this implicitly means that the image plane and the object plane *coincide* with each other and it is implicitly true that an image projector implicitly comprises a *focusing unit* for forming the image at the image plane. However this reference does not teach explicitly that the focusing unit comprises a lens having variable refractive index and a control unit for adjusting the refractive index therefore controls the focus of the lens.

Piosenka et al in the same field of endeavor teaches an *auto-focusing optical apparatus* that includes a *lens* containing *liquid crystal material* with *variable refractive index* wherein the refractive index is controlled by the amount of voltage or electrical field applied (with respect to *claims 4-6 and 14-16 and newly added claims 24-26*) and the focus of the lens via the change of the refractive index is adjusted according to the measured distance between the support of the lens and the object plane and the distance between the observer's eyes and the support for the lens, (please see Figure 11 and the abstract). Piosenka et al further teaches, (with respect to *claims 2-3, 8-9, 12-13 and 18-20 and newly added claims 21-22, and 28-30*), that a *measurement module* is included to measure the distances mentioned above and the measurement module includes a *lens control* for controlling the focus of the liquid crystal lens, (please see Figure 12). It would then have been obvious to one skilled in the art to apply the teachings of Piosenka et al to replace the focusing unit in the image projector of the Ferguson to make the focusing lens an *auto-focusing lens* to *ensure* the image generated from the image projector is *always properly* focused and superimposed on the real actual object since the projection display disclosed by Ferguson is a head mount display wherein by the motion of the observer the projected image will easily be off-focused from the actual real object and lose the purpose of superimposing the projected image with the real actual object.

Piosenka et al teaches that infrared sensor is used to detect the position of the object to give the information for auto-focus adjustment. Although it does not teach explicitly that the auto-focus sensor or

Art Unit: 2872

the infrared sensor is receiving the object information through a first beam splitter, (with respect to the newly added claim 21), however such modification is considered obvious to one skilled in the art since it only involves rearranging the geometry of the device that does not affect the function of the auto-focusing sensor and the auto-focusing adjustment at all.

With regard to claims 7 and 17 and newly added claim 27, Ferguson teaches that the superimposing unit comprises a beam splitter that includes a splitter mirror, (12).

**9. Claims 1, 4-7, 10, 11, 14-17 and 20 and newly added 21, 24-27, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ferguson (PN. 6,379,009) in view of the patent issued to Baba et al (PN. 4,802,746).**

*Claims 1 and 11 have been amended and the newly added claims 21, 24-27 and 30 add new claim combination that necessitate the new grounds of rejection.*

Ferguson teaches a conjugate optics *projection display* that is comprised of an *image projector* (16, Figures 1 and 2) for generating an image in an image plane and a first and second *beam splitter* (14 and 12, with regard to amended claims 1 and 11 and newly added claim 21) serves as the *superimposing unit* such that the *projected image* via conjugate optics will be *superimposed* on a real, actual *object* (11) at an *object plane* and the superimposed image will be viewed by an observer (10), wherein the image projector and the superimposing unit are *mounted* on a *head wearable support unit*, (please see Figures 1-2, the abstract and columns 3-4).

With regard to amended claims 1 and 11 which includes the feature of “lacking retroreflector for receiving beams light that is transmitted by the first or second beams splitter and reflects to the first or second beam splitter”, it is implicitly true that the image light transmits through the beam splitter (14) can be reflected by the second beam splitter (12) to the object and back to the observer without going through



Art Unit: 2872

the retro reflector. The feature concerning the “lacking a retroreflector” is further rejected under 35 USC 112, first paragraph, for being a newly introduced matters and for failing to enable the device and method.

Ferguson teaches that the projected image is intended to be superimposed with the actual and real object in order to enhanced the viewing of the actual object, this implicitly means that the image plane and the object plane *coincide* with each other and it is implicitly true that an image projector comprises *focusing unit* for forming the image at the image plane. However this reference does not teach explicitly that the focusing unit comprises a lens having variable refractive index and a control unit for adjusting the refractive index therefore controls the focus of the lens.

**Baba et al** in the same field of endeavor teaches a *variable focus optical element* wherein the variable focus optical element utilizes a *liquid crystal material* with *variable refractive index* such that the refractive power of the lens is adjustable via and in response to a *focus detecting device*, (please see Figures 9-10, column 2, lines 3-38 and column 13, lines 64-69). With regard to claims 4-6, 14-16, and 24-26, **Baba et al** teaches that the variable focus optical element utilizes liquid crystal material, which is an electro-optical material, such that the refractive index of the liquid crystal is varied or adjusted in response electrical field applied, (please see column 13, line 64 to column 14, line 2). With regard to claims 10, 20 and 30, **Baba et al** further teaches that the focus detecting device comprises a *measurement module* including *an image sensor* (39, Figures 9-13), which detects the image light from the object via the variable focus optical element (32) and a sharpness detecting circuit (42), such that based on the sharpness of the image detected a control signal is send to control the refractive power and therefore the focus of the variable focus optical element. This variable focusing optical element and the focus-detecting unit therefore together serves as the auto-focus unit, (please see column 9, line 36 to column 10, line 14 of **Baba et al**). It would then have been obvious to one skilled in the art to apply the teachings of **Baba et al** to replace the focusing unit in the projector of the **Ferguson** to make the focusing lens a focus variable lens with a focusing detecting device to *ensure* the image generated from the image projector is

Art Unit: 2872

*always properly* focused and superimposed on the real actual object since the projection display disclosed by Ferguson is a head mount display wherein by the motion of the observer the projected image will easily be off-focused from the actual real object and lose the purpose of superimposing the projected image with the real actual object.

Baba et al teaches that an image sensor (39) is used to detect the position of the object to give the information for auto-focus adjustment. Although it does not teach explicitly that the auto-focus sensor or the image sensor is receiving the object information through a first beam splitter, (with respect to the newly added claim 21), however such modification is considered obvious to one skilled in the art since it only involves rearranging the geometry of the device that does not affect the function of the auto-focusing sensor and the auto-focusing adjustment at all.

With regard to claims 7, 17 and 27, Ferguson teaches that the superimposing unit comprises a beam splitter that includes a splitter mirror, (12).

### ***Response to Arguments***

10. Applicant's arguments with respect to newly amended claims 1-20 and newly submitted claims 21-30 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action

Art Unit: 2872

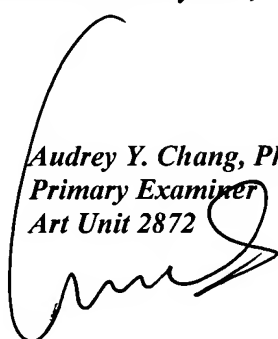
is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Audrey Y. Chang, Ph.D.*  
*Primary Examiner*  
*Art Unit 2872*



A. Chang, Ph.D.